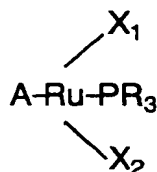


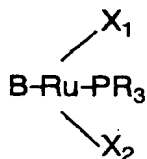
## Claims

1. A polymer-supported arene-ruthenium complex characterized in that the complex is represented by the following formula:



wherein A represents an organic polymer with a side chain comprising an aromatic ring coordinated to Ru, X<sub>1</sub> and X<sub>2</sub> represent the same or different halogen atoms, and R represents a hydrocarbon group that may have a substituent.

2. The polymer-supported arene-ruthenium complex of claim 1, characterized in that the hydrocarbon group is an alicyclic hydrocarbon group or an aromatic hydrocarbon group.
3. The polymer-supported arene-ruthenium complex of claim 1 or 2, characterized in that the aromatic ring of the side chain is a benzene ring.
4. The polymer-supported arene-ruthenium complex of any one of claims 1 to 3, characterized in that the organic polymer is a polystyrene.
5. A method for producing the polymer-supported arene-ruthenium complex of any one of claims 1 to 4, characterized by comprising a ligand exchange of a complex monomer represented by the following formula:



wherein B represents an aromatic compound comprising an aromatic ring coordinated to Ru, and X<sub>1</sub>, X<sub>2</sub> and R are as defined above, with an organic polymer A with a side chain comprising an aromatic ring.

6. A polymer-supported arene-ruthenium catalyst for an organic synthesis reaction, characterized by comprising the polymer-supported arene-ruthenium complex of any one of claims 1 to 4 as an active component.

7. The polymer-supported arene-ruthenium catalyst of claim 6, characterized in that the catalyst is prepared by mixing the complex with a phosphine compound.

8. The polymer-supported arene-ruthenium catalyst of claim 7, characterized in that the catalyst is prepared by being mixed with MPF<sub>6</sub>, in which M represents a monovalent cation.

9. The polymer-supported arene-ruthenium catalyst of claim 8, characterized in that the catalyst is prepared by being mixed with an alkynyl alcohol compound.

10. A method of an organic synthesis reaction, characterized in that a ring-closing metathesis reaction of an olefin compound is carried out in the presence of the catalyst of any one of claims 6 to 9.

11. A method of an organic synthesis reaction, characterized in that reduction of a carbonyl group is carried out in the presence of the catalyst of claim 6 or 7, to synthesize an alcohol compound.

12. A method of an organic synthesis reaction, characterized in that a reaction comprising carbon-carbon addition of an acetylene group is carried out in the presence of the catalyst of any one of claims 6 to 8.